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BEFORE THE
Federal Communications Commission
WASHINGTON, D.C.

In the Matter of)
Annual Assessment of the Status of) CS Docket No. 95-61
Competition in the Market for the)
Delivery of Video Programming)

COMMENTS OF GENERAL INSTRUMENT CORPORATION

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List A B C D E

TABLE OF CONTENTS

	PAGE NO.
INTRODUCTION AND SUMMARY	1
I. THE COMMISSION MUST TAKE INTO ACCOUNT PIRACY AND NETWORK SECURITY IN ANY ANALYSIS OF MVPD COMPETITION, DIGITAL CONVERSION, RETAIL SALE, AND EQUIPMENT COMPATIBILITY	5
II. PROPER GOVERNMENT ROLE IN TECHNICAL STANDARDS SETTING .	11
A. The Marketplace, Not Government, Should Set Technical Standards	11
B. Government Standards Are Particularly Ill Advised in Highly Dynamic and Evolving Markets	13
C. Standardization Commoditizes Products, Thereby Driving Business from the United States to Countries That Thrive on the Mass Production of Homogenized Offerings	16
III. IMPACT OF SECURITY AND STANDARDS SETTING ON CONVERSION TO DIGITAL, RETAIL SALE OF CUSTOMER EQUIPMENT, AND EQUIPMENT COMPATIBILITY ISSUES	17
A. Digital Conversion	17
1. The Benefits of Digitization	17
2. Government Standards Other Than a Digital Broadcast Standard Should Be Avoided	18
3. The Commission's ATV Standards Process Must Take Into Account the Interests of MVPDs that Are Already Implementing Digital Technology .	20
4. Security is a Critical Element to a Successful Conversion to Digital Technology .	21
B. Competition for Set-Top Boxes	22
1. The Market for Video Customer Equipment Already is Competitive	23
2. Retail Sale	25

a.	The Availability of Customer Equipment on a Retail Basis Should Be Left to the Market	25
b.	Government Mandated Retail Sale of Video Customer Equipment Could Harm the Public Interest	28
c.	The Telco CPE Analogy Is Inapt	32
C.	Equipment Compatibility	33
1.	Incompatibilities Between TVs/VCRs and MVPDs Are the Inadvertent Byproduct of Industries with Different Technology Life Cycles	33
2.	Incompatibilities Also Arise As a Result of Operator Efforts to Prevent Consumers From Stealing Their Signals	36
IV.	SPECIFIC RECOMMENDATIONS	40
A.	Security	40
1.	Avoid Further Federal Restrictions on Operator Discretion to Employ Particular Security Techniques	40
2.	Preempt Local Attempts to Restrict Operator Discretion to Employ Particular Security Techniques	41
B.	Adopt Streamlined Cost Recovery Mechanisms to Promote Substantial System Upgrades	42
	CONCLUSION	44
	EXHIBIT	

Excerpts from Radio Shack Catalogs from 1989, 1990, 1991,
and 1995 and from a Damark catalog from 1994.

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COMMENTS OF GENERAL INSTRUMENT CORPORATION

General Instrument Corporation ("GIC") submits these comments in response to the Commission's Notice of Inquiry ("NOI") in the above-captioned proceeding.¹

INTRODUCTION AND SUMMARY

GIC is a world leader in developing technology, systems, and product solutions for the delivery of video, voice, and data. GIC is dedicated to deploying leading-edge technology through intensive research and development; high-quality, low-cost manufacturing; and superior customer service and support.

In 1991, GIC was the first company to demonstrate digital compression technology for the cable industry. Since that time, GIC has become a leader in the telecommunications industry's

¹ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, Notice of Inquiry, CS Docket No. 95-61, FCC 95-186 (released May 24, 1995) ("NOI").

efforts to implement digital technology. GIC offers complete digital compression and transmission systems across all industry segments -- from the equipment that encodes and transmits the signal up to the satellite, to the intelligent set-top terminal in the consumer's home, and everything in between. GIC is currently supplying digital video compression equipment to the satellite programming industry, and is a leading manufacturer and supplier of encryption equipment for the home satellite television market. GIC has already received orders for 2.5 million digital home terminals from the cable industry. Field testing of its digital television products for cable will occur this summer, with deployment expected to begin in the fourth quarter of 1995.

GIC's leadership in digital technology dates back to June 1990, when its breakthrough work in the area of high definition television led to the announcement of the world's first all-digital HDTV system, thereby dramatically thrusting the United States into world leadership in advanced television. During 1991 and 1992, two of the four all-digital HDTV systems tested by the FCC's Advisory Committee on Advanced Television Service ("ACATS") were developed by GIC. In May, 1993, GIC joined with the other all-digital proponents in the Digital HDTV Grand Alliance to build a unified system for consideration as the U.S. advanced television broadcast standard.

Finally, GIC is an active participant in several industry standards-setting organizations, including the Cable-Consumer

Electronics Compatibility Advisory Group ("C3AG") which is currently negotiating a Decoder Interface standard to assure a consumer friendly and secure interface between TVs/VCRs and cable systems. GIC has also been a principal contributor to the efforts of the Digital Audio-Visual Council ("DAVIC"), a global organization comprised of hundreds of technical experts in the digital video/audio arena focused on establishing international specifications of open interfaces and protocols to facilitate interoperability of emerging digital network services.

As a manufacturer of equipment for broadband communications applications, GIC is particularly interested in two aspects of the Commission's continuing efforts to foster enhanced competition in the multichannel video programming distribution ("MVPD") marketplace:

Signal Security. Meaningful competition between MVPDs is premised upon the comparable ability of each MVPD to charge end users for their services. In order to charge for services, video providers must be able to prevent the theft of their signals. As obvious and sensible as this seems, a variety of interest groups in various Commission proceedings have advocated positions that would limit the ability of video providers to secure their signals. It is critical that when the Commission adopts rules and policies designed to foster competition in the market for the distribution of video programming it design those rules in a manner that permits distributors to take steps, including

scrambling, to prevent theft of the product they are distributing.

The Role of Government in Standard Setting. As a general matter, the Commission should avoid setting technical standards. While government approval of a digital broadcast standard ultimately may be necessary to preserve broadcasters' ability to maintain a national market, standard setting for the most part should be left to marketplace forces. This is especially important during periods of dramatic technological change. While the U.S. is at the vanguard in deploying digital video, these services are still in the very early stages of development. Whether the "network" in question is owned by a satellite company, a cable operator, or a telephone company, digital video is in its infancy. During this nascent stage of development, network operators, as well as equipment manufacturers, should be encouraged to engage in extensive research and development and the technical and marketing trials required to implement new technology without the fear that the government will prematurely establish technical standards, thereby ending this dynamic evolution and stifling future innovation. The marketplace can and will allocate resources to those technologies which satisfy consumer demand most efficiently.

In these comments, GIC will discuss security and technological standard setting and how each of these principal

themes relates to the following three issues raised by the Commission in the NOI:

- The conversion to digital technology;
- Retail sale of customer equipment; and
- Equipment compatibility.

I. THE COMMISSION MUST TAKE INTO ACCOUNT PIRACY AND NETWORK SECURITY IN ANY ANALYSIS OF MVPD COMPETITION, DIGITAL CONVERSION, RETAIL SALE, AND EQUIPMENT COMPATIBILITY

GIC is concerned that nowhere in the NOI does the Commission address the very serious issue of signal theft and its potential impact on the level of competition in the MVPD marketplace, as well as on the various other issues addressed in the NOI.

Piracy is a significant problem for all MVPD providers. In the cable industry alone, signal theft costs an estimated \$4.7 billion in unrealized revenue annually (24 percent of total 1991 industry revenue).² Overall, approximately one out of every ten basic service customers and one out of every ten premium service customers illegally obtain their cable service.³

Moreover, the impact on service revenue represents only a fraction of the total costs of cable piracy. Over the last six years, the Office of Cable Signal Theft helped to stop illegal sales of over 1.5 million customer decoder units while law enforcement agencies continue to seize more than 250,000 illegal

² National Cable Television Association, "1992 Theft of Service Survey Results." The \$4.7 billion in unrealized revenues annually was calculated using conservative monthly average rates (\$17.95 basic and \$10.28 premium).

³ Id.

units each year.⁴ Each single illegal decoder sold to a consumer costs the cable industry approximately \$3,108 in lost revenue over the equipment life.⁵ Engineering analysis of this seized product substantiates that 75 percent of the units were capable of circumventing addressable technology to allow the illegal reception of pay-per-view services, representing further service revenue losses in addition to the \$4.7 billion calculated in the 1992 NCTA Cable Theft Survey.⁶ In addition, piracy can affect the picture quality of the system by weakening the signal, resulting in additional service calls, system maintenance, and internal theft enforcement and prevention measures.

Further complicating enforcement efforts, Commission regulations continue to sanction the retail sale of the very devices used to pirate cable services.⁷ Even when such devices have been altered for unauthorized reception of scrambled premium and pay-per-view services, the ability of current law to protect the cable operator remains suspect. Indeed, Everquest, Inc. recently challenged the Commission's authority to withhold certification from descramblers capable of providing unauthorized reception of cable services.⁸ As the Everquest petition exposes,

⁴ See NCTA "Cable Piracy Facts," March 1995.

⁵ Id.

⁶ Id.

⁷ See Douglas Abrahams, "Cable-box Makers Seek Redress For Federal Raids," The Washington Times, June 2, 1995 at A1, A18.

⁸ See Public Notice, DA 95-1284 (released June 9, 1995).

current federal regulations make it very difficult for the Commission to prevent the marketing and distribution of equipment that can be used for the unauthorized reception of cable services.

The result is that the illegal market for cable converter boxes has become increasingly lucrative -- and disturbingly violent. Because the purchasers of illegal decoder boxes face little or no risk of prosecution, the street value of converter boxes has risen to as high as \$300, sparking a flurry of raids on cable facilities and internal thefts.⁹ Recent examples include:

- the armed raid of a Queens, New York cable warehouse where six masked gunmen bound four workers for over two hours while stealing almost 2000 addressable converter units;
- the invasion of a cable warehouse in the Bronx, New York, by three gunmen resulting in the eventual beating of the workers and a gunfight with two policemen; and
- a Los Angeles raid on a cable facility by nine armed men who beat and threatened trapped employees, one of whom was a woman who was five months pregnant.¹⁰

Piracy in the DBS, HSD, MMDS, and SMATV industries is equally problematic.¹¹ One satellite industry organization reports spending two-thirds of its budget on preventing signal

⁹ See John M. Higgins & Linda Haugsted, "Pirates Growing More Brazen -- And Violent," Multichannel News, February 20, 1995, at 3, 16.

¹⁰ Id.

¹¹ See, e.g., Communications Daily, September 28, 1994 at p. 6 (satellite industry representative reporting consistent problem of signal theft throughout the satellite industry, especially with the rise of DBS); Communications Daily, October 17, 1990, p. 8 (reporting seizure of over 50,000 MMDS descramblers).

theft because otherwise "there would be no satellite industry today."¹² The Commission, which historically has exhibited a genuine interest in ensuring network security, has concurred in this assessment:

The number one problem facing the HSD industry today is piracy, or the theft of programming services. If unchecked, piracy could threaten the future viability of the entire industry.¹³

Internationally, signal theft continues to be the number one contributor to the more than \$8.57 billion lost in trade exports due to piracy.¹⁴ In Latin America, Europe and Asia, rampant piracy continues as a major hurdle to tapping the high international demand for U.S. entertainment exports.¹⁵

¹² Communications Daily, September 28, 1994 at p. 6 (quoting SBCA President Charles Hewitt).

¹³ Inquiry into Scrambling of Satellite Television Signals and Access to Those Signals by Owners of Home Satellite Dishes, 3 FCC Rcd. 1202, ¶ 79 (1988). See also Inquiry into the Scrambling of Satellite Television Signals by Owners of Home Satellite Dish Antennas, 2 FCC Rcd. 1669, at ¶ 58 (1987) ("We deplore these attempts to gain illegal access to scrambled satellite cable programming. The ability to deny reception of nonbroadcast unauthorized transmission to parties is a cornerstone of our telecommunications system. In addition to weakening that system, would-be "pirates" also strike a blow at the HSD programming market").

¹⁴ "To Catch A Thief; Piracy in the Entertainment Industry," Multichannel News, April 3, 1995 at p. 18B.

¹⁵ Id. See also "Valenti Looks to Mend Fences in Monte Carlo," Broadcasting & Cable, February 14, 1994 (describing the Asian piracy problem as "total anarchy"); "People to Watch Across the Americas; Cable Television Executives," Multichannel News, May 16, 1994 at p. 8A (Latin American cable executive describing piracy as the number one problem in the Central and South American cable industries); "Pirate Peace; Subscription Television Piracy," Multichannel News, March 6, 1995 at p. 3A (reporting industry concern that implementation of satellite technologies in Latin America would escalate piracy); "The

Nor are the negative effects of signal piracy limited to the network distributor and equipment provider. Programmers, honest consumers, and others also are injured.¹⁶

As the foregoing discussion demonstrates, piracy is a major problem in the delivery of video programming across all delivery means and should be a major factor in any Commission assessment of the competitive structure of the MVPD industry. Without such analysis, the Commission cannot possibly weigh the true impact of decisions contemplated by the NOI, such as decisions relating to government standard setting, the conversion to digital, the retail sale of equipment, or cable operator use of scrambling technologies.

Based on many years of experience developing and implementing security systems, GIC respectfully submits that the

Digital Dance," Multichannel News, March 6, 1995 at p. 16A (European Digital Video Broadcast group struggles with the issue of piracy as major hurdle to adopting industry standards).

¹⁶ See, e.g., See H.R. Rep. No. 934, 98th Cong., 2d Sess. 83 (1984) ("The Committee believes that theft of cable service poses a major threat to the economic viability of cable operators and cable programmers, and creates unfair burdens on cable subscribers who are forced to subsidize the benefits that other individuals are getting by receiving cable service without paying for it"); Statement of Richard S. Friedland, President & Chief Operating Officer General Instrument Corporation, before the NII Security Issues Forum, July 15, 1994, at 4 ("Friedland Security Statement") ("This theft injured programmers, who were deprived of compensation for the use of their intellectual property. It injured legitimate satellite dealers who found themselves unable to compete with other dealers who offered "free" programming through modifications of descramblers. It injured honest consumers, who paid for programming while others were stealing it").

following fundamental facts and principles should underlie all Commission decisions in these areas:

- No matter how good the security system is, it will eventually be broken if the value of the material being protected is great enough. For this reason, security must be renewable. The fact that security is renewable is itself a disincentive to attempts at theft.
- Operators must retain maximum flexibility to utilize the most effective security technology for their networks. Government must not hamper innovation in the development of responses to security breaches and in the development of new forms and methods of security.
- A single national uniform security standard, which is advocated by some, is a dangerous idea. It provides attackers with a single target with enormous return and would stifle the innovation necessary for security to stay ahead of attackers.
- Publishing details of security systems weakens security. Thus, open standards are undesirable.
- In implementing security, access by pirates to security circuitry should be minimized. Therefore, unbundling and open interface requirements should be avoided.
- Control of security functions should reside with those who have an incentive to protect intellectual property, namely network operators. Proposals to permit or mandate greater access to network security functions, for example, by retail suppliers, should be rejected.
- While software-based security may be adequate for some applications, hardware-based security may be needed for others.¹⁷

In sections III, IV, and V, infra, GIC discusses the implications of network security, and Commission policies regarding security, for conversion to digital, retail sales, and equipment compatibility.

¹⁷ See Friedland Security Statement at 6-8.

II. PROPER GOVERNMENT ROLE IN TECHNICAL STANDARDS SETTING

A. The Marketplace, Not Government, Should Set Technical Standards

The NOI asks whether the Commission should adopt standards for any or all transmission media.¹⁸ As a general matter, GIC submits that the government should not set technical standards. Instead, it should rely on the marketplace to drive these decisions. The desirability of market-driven as opposed to government-prescribed standards is strongly supported by an economic analysis of technological standards done by two divisions of the FTC and submitted in the FCC's digital audio broadcasting proceeding ("FTC Standards Analysis").¹⁹ The FTC Standards Analysis urged the Commission to leave decisions on technological standards to the market:

The staff believes that the FCC should consider leaving decisions on technological standards to the market. Our conclusion follows from an analysis of the current literature on standard-setting discussed below. In many instances the market will operate to resolve efficiently the standard-setting issues. Furthermore, in those instances where the market will not achieve the efficient result, there is no reason to believe that a regulatory selection will achieve a preferable outcome. Since it is not possible in this context to identify situations in which markets will operate efficiently from those in which it will fail, this suggests that consumers would likely benefit most from

¹⁸ NOI at ¶ 71(f).

¹⁹ Comments of the Staff of the Bureau of Economics and the San Francisco Regional Office of the Federal Trade Commission, submitted in Establishment and Regulation of Digital Audio Radio Services, Gen. Docket No. 90-357, January 25, 1991 (published at 1991 FCC LEXIS 638).

a general FCC policy that leaves the determination of standards to the market.²⁰

Other analyses of this issue have resulted in equally steadfast opposition to efforts to manage technological change through government-mandated technical standard setting. For example, a recent white paper by the Alliance to Promote Software Innovation and the Business Software Alliance concluded:

[O]verly broad regulatory standard setting proceedings could create an "aversion" to technological progress and capital formation, thus undermining the incentive of companies to invest in new technologies ... [R]egulatory intervention could drastically change today's successful, open, voluntary, marketplace-driven, private-sector-led, consensus standards, development process in the technology critical for the successful development of the information marketplace.²¹

Marketplace forces are simply a better, more efficient, arbiter for setting technical standards.

One example of the potential drawbacks of technical standard setting by the government is provided by Part 68 of the Commission's rules. Part 68 contains detailed specifications for interconnection between telephone terminal equipment and the telephone network. Because Part 68 is part of the Code of

²⁰ Id. at 32. The FTC Standards Analysis should be accorded considerable weight in this context given the FTC's responsibility for maintaining competition and safeguarding consumer interests, as well as its expertise on matters concerning the selection of technological standards. See id. at n.7 (identifying those FCC proceedings in which the FTC has submitted comments on the selection of technological standards).

²¹ The Information Marketplace: The Perspective of the Software and Computer Industry, Special Focus Paper, Spring 1995, at 11.

Federal Regulations, amending it typically requires a rulemaking proceeding, a process which can take several years to complete. This combination of rigid detailed specifications and the administrative difficulty of making changes has constrained the introduction of new technologies into the telephone network.

Part 68 makes no provision for digital telephones that can only be connected to PBXs, nor for new transmission methods such as Asynchronous Transfer Mode ("ATM"), Integrated Services Digital Networks ("ISDN"), or Asymmetric Digital Subscriber Line ("ADSL"). Such techniques are employed in private networks. In late 1993, the FCC proposed to add ISDN to Part 68, but no rules have yet been adopted.

In short, while the Part 68 specifications were adopted by the government at a time when analog telephone technology was stable, as technology changed over time these government standards stifled the deployment of new technologies and services. Codification of these rules in government specifications has made upgrades to the telephone network more difficult.

B. Government Standards Are Particularly Ill Advised in Highly Dynamic and Evolving Markets

Pursuing a market-driven approach to standard-setting is especially critical in highly dynamic and evolving industries. In such industries, where technological change is rapid, standards freeze the current level of technology in place and stifle the development of new technologies. The lesson of the personal computer industry is instructive on this point. During

the past decade, American companies dominated the worldwide personal computer market. They rewrote the rules of technological innovation; created new paradigms for education, business, and entertainment; and in the process put thousands of Americans to work in high-skilled jobs. And during this time the government showed great wisdom. It stayed out of the way.

When the government permits the market to operate unfettered, innovators innovate, competition flourishes, consumer choices increase, and prices plummet.²² When the technology "settles down," standards will be established by the market or industry bodies.²³ As Drs. Besen and Johnson, two prominent experts on technological standards, aptly conclude on this point:

[T]he government should refrain from attempting to mandate or evaluate standards when the technologies themselves are subject to rapid change. A major reason for the Commission's difficulty in establishing the first color television standard was the fact that competing technologies were undergoing rapid change even during the Commission's deliberations. It is only after the technologies have "settled down" that

²² In this regard, GIC has two comments on the \$600 cost figure cited by the Commission as the price for "the most basic of digital set-top boxes." NOI at 67. First, while \$600 may reflect the cost for the most basic DBS digital box, the basic digital boxes planned for rollout in cable systems later this year will cost approximately \$400-\$450. Second, as more digital boxes are deployed, the cost of these boxes will continue to drop. Thus, government standardization is not required to drive down the prices for digital boxes.

²³ For example, the cable TV channel plan was developed by the cable and consumer electronics industries cooperatively in the EIA/NCTA Joint Engineering Committee and implemented in both industries at essentially the same time.

government action is most likely to be fruitful, as illustrated in the TV stereo case.²⁴

Of course, this is precisely the approach the Commission took in the licensing of PCS spectrum where it decided that, given the rapid technological change inherent in PCS development, a flexible regulatory approach to PCS technical standards was warranted:

[M]ost parties recognize that PCS is at a nascent stage in its development and that imposition of a rigid technical framework at this time may stifle the introduction of important new technology. We agree, and find that the flexible approach toward PCS standards that we are adopting is the most appropriate approach.²⁵

²⁴ Stanley M. Besen and Leland L. Johnson, "Compatibility Standards, Competition, and Innovation in the Broadcasting Industry," Rand Corporation, November 1986, at 135 ("Rand Compatibility Study"). See also EIA and TIA White Paper on National Information Infrastructure, 1994, at 9 ("In areas of rapidly changing technology, premature adoption of a standard can impede innovation"); The Information Marketplace: The Perspective of the Software and Computer Industry, Special Focus Paper, Spring 1995, at 11 ("[S]etting standards too early in the development of the information marketplace would lock us into technologies which ultimately will retard the efficient evolution and use of these networks"); Peter Pitsch and David C. Murray, "A New Vision for Digital Telecommunications," A Briefing Paper, No. 171, The Competitiveness Center of the Hudson Institute, Indianapolis, IN, December 1994, at 2 ("[G]overnment is ill-equipped to regulate tightly a fast-paced environment characterized by rapid technological change and continuous innovation in services. If it tries, its efforts will almost certainly backfire").

²⁵ PCS Second Report and Order, Gen. Docket 90-314, FCC 93-451 (released October 23, 1993) at ¶ 137.

Predictably, this decision has fostered a vigorous level of innovation and competition among vying PCS transmission schemes.²⁶

C. Standardization Commoditizes Products, Thereby Driving Business from the United States to Countries That Thrive on the Mass Production of Homogenized Offerings

Standardization commoditizes products. Commoditization drives businesses and jobs from the United States -- which excels in innovative, entrepreneurial technological developments -- to countries that thrive on the mass production of homogenized and non-innovative products. The commoditizing effects and harsh business impact of standardization are well described by Ferguson and Morris in their study of IBM and business strategies in the computer industry:

Japanese companies, and Asian companies generally, have succeeded, by and large, by being superb *commodity implementers* within well-defined, stable, open, nonproprietary standards -- standards, that is, that are defined by regulatory agencies, other government bodies, industry standards-setting organizations, or very slow-moving incumbents, such as IBM has been in mainframes in recent years. Nonproprietary standard products, such as memory chips, printers, VCRs, CD players, or facsimile machines, are brutally competitive businesses, with high investment requirements and razor-thin margins.

But industries that are fast-moving, where standards are constantly evolving, and where the standards themselves are within the proprietary control of an individual company, are hostile environments for commodity implementers. And the computer industry in the 1990s, under the technological impetus and creative impulse of the American start-ups, has been transmuting into just such an industry, shifting the ground out from under both the slow-moving Western giants and the commodity manufacturing-oriented Japanese giants.

²⁶ See "CDMA Wins Major Backer in Bells' PCS Primeco," Multichannel New, June 12, 1995, at 1A.

The race over the next decade will be between the Japanese and American styles of industry development. The Japanese will drive to componentize and commoditize every sector of industry so their great monolithic and lean manufacturing skills can define the industry's future. American companies must keep accelerating the pace of technological change to avoid giving the Japanese a stable target to shoot at, and at the same time develop their own manufacturing skills to the point where low-end market share is not conceded too easily.²⁷

So the problem is not merely the stifling of innovation, but rather, that the very industries of critical importance to the U.S. economy are most susceptible to the negative effects of standardization. The digital revolution is uniquely the product of U.S. research and development. It represents a national asset that must be preserved. Such preservation requires, at a minimum, that the government refrain from setting standards in dynamic markets.

III. IMPACT OF SECURITY AND STANDARDS SETTING ON CONVERSION TO DIGITAL, RETAIL SALE OF CUSTOMER EQUIPMENT, AND EQUIPMENT COMPATIBILITY ISSUES

A. Digital Conversion

1. The Benefits of Digitization

The introduction of digital technology into the MVPD market has and will continue to produce numerous public benefits, including expanded channel capacity, greater program diversity, and improved picture quality. The Commission is correct to point out that digitization will have profound effects on the future of

²⁷ Charles H. Ferguson and Charles R. Morris, Computer Wars, Times Books, Random House at 9, n. 17; 113-14; 221 (New York 1993).

competition in the video distribution market.²⁸ For example, MMDS operators, whose networks heretofore have been incapable of delivering more than 33 channels using analog transmission technology, will, through the implementation of digital technology, geometrically expand their channel capacity, their program offerings, and hence their competitive posture in the MVPD marketplace.

Digitization also makes possible the simultaneous transmission of voice, video, and data information over the same multimedia pipe and unleashes countless possibilities in the realm of interactive applications.

2. Government Standards Other Than a Digital Broadcast Standard Should Be Avoided

The foregoing benefits may prove elusive, however, if technical standards are prescribed by the Commission. While adoption of a digital broadcast standard may be necessary for broadcasters to launch over-the-air digital television service, government imposition of standards on other video distributors is unwarranted and unwise.

The MVPD marketplace is currently undergoing the most dynamic period of technological innovation and experimentation in its history. The diverse innovative approaches currently being pursued by various cable industry players with respect to the implementation of interactive digital video alone necessitates a rethinking of any attempt to lock down this industry by setting

²⁸ NOI at ¶ 65.

digital standards. For example, TCI has ordered more than a million digital home terminals and will launch an evolutionary approach to digital TV implementation next year, beginning with the wide-scale deployment of near-video-on-demand and other digital services. Time Warner, meanwhile, is focusing its sights on moving into the interactive video market when the Full Service Network ("FSN") platform underway in Orlando, Fla., has matured. A third approach is planned by Cablevision Systems Corp. which intends to launch video-on-demand from servers on its Long Island, N.Y. system by year's end using a stripped-down version of the system developed for Time Warner's FSN.²⁹

The establishment of digital video standards is problematic not only because of the rapidly evolving technology in the cable industry, but also because of the fact that there are multiple technologies for distributing multichannel video programming, each of which is evolving in its own way and at its own speed. DBS already has launched its digital video systems and has sold over one million digital satellite receivers to consumers. Telcos have continued to explore whether Asymmetric Digital Subscriber Line ("ADSL"), hybrid fiber coax ("HFC"), or switched digital video ("SDV") will be their video platform of choice. MMDS operators are at the brink of implementing digital compression in their systems.

²⁹ See "Tech Debate Blurs Digital Agenda," Multichannel News, June 12, 1995, at 1A.

In short, the MVPD marketplace is characterized by multiple technologies engaged in an explosion of creativity and innovation. The results will enrich the lives of consumers and ignite economic growth. This marketplace is moving and moving fast. It would be tragic if the Commission were to call a halt to this activity by precipitously imposing digital video standards on any or all MVPD technologies.

Finally, each distribution technology, due to the inherent differences in the media over which they transmit their signals, typically uses a different modulation or transmission scheme in order to optimize transmission over that particular medium. For example, satellite networks, such as DBS, use QPSK modulation, while the cable industry has selected QAM as its digital modulation standard. The FCC's own Advisory Committee on Advanced Television Service is considering yet a third modulation method for digital broadcasting -- VSB or COFDM. This diversity of modulation methods is a function of the physics of each transmission medium. Thus, even if the Commission were inclined to impose digital standards for the MVPD marketplace, it could not do so for the digital modulation scheme without seriously threatening the efficiency of each unique transmission medium.

3. The Commission's ATV Standards Process Must Take Into Account the Interests of MVPDs that Are Already Implementing Digital Technology

The cable and satellite industries are already well into the process of implementing digital technology. Millions of dollars have already been spent on extensive research and development

efforts by GIC and others. Digital boxes have been ordered in the millions, and business plans are finalized and being implemented. Digital transmissions are already being received in consumers' homes, and more than one million digital set-top boxes have been deployed. Before the first broadcast-capable TV receiver is sold, millions more digital set-top boxes will be in homes throughout America. Most of those receivers will be connected to cable and satellite networks. To avoid future possible consumer compatibility issues, GIC urges the Commission to harmonize the broadcast ATV standard with the preexisting digital technology in cable and satellite networks.³⁰

Throughout the HDTV/ATV process, the Commission has consistently, and commendably, adapted to relevant marketplace developments. For example, the Commission, with great foresight, scrapped the analog HDTV proposals and insisted on digital system proposals. At the Commission's insistence, the ATSC digital HDTV standard for broadcast is being broadened to include Standard Definition Television ("SDTV"). The Commission should therefore now take into account other SDTV technology in the marketplace.

4. Security is a Critical Element to a Successful Conversion to Digital Technology

The conversion to digital technology by MVPDs will depend greatly on operators' ability to protect the digitally encoded

³⁰ Interoperability of video compression, audio compression, and transport should be achievable without substantial difficulty. For the reasons discussed at p. 20, supra, regarding the necessity of media-specific modulation schemes, this harmonization process should not include an attempt to conform to a single modulation technique.

intellectual property transmitted over their systems. If distributors' efforts in this regard are impeded by government policies regarding the use of certain security technologies, the rollout of digital capability -- and all the attendant benefits -- will be impaired. Investment in digital technology may be diminished if investors are not confident that intellectual property will be safeguarded. Similarly, information providers will be less inclined to market their creative works to such networks if they fear that their work will be pirated. To put it another way that is more directly relevant for the Commission's NOI, if an operator is unable to adequately safeguard the intellectual property which it transmits over its network, the operator's ability to effectively compete will be reduced.

B. Competition for Set-Top Boxes

In the NOI, the Commission invites comment on several issues regarding set-top boxes, including: (1) the extent to which current market conditions inhibit the development of a competitive market for set-top boxes;³¹ and (2) whether the Commission should "take steps" to promote the development of a competitive retail market for customer-owned set-top boxes that is separate from markets for the provision of video services.³² As to the former issue, GIC points out below that the market for the manufacture of set-top boxes already is competitive. As to the latter issue, GIC believes that the retail availability of

³¹ Id. at ¶ 73(d).

³² Id. at ¶ 73(e).